

**ABSTRACT**

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An apparatus and a method for forwarding data packets through a fiber optic ring network includes forwarding data packets on a packet by packet basis. A node on the fiber optic ring network decides on a packet by packet basis whether to transmit on the working or protection path. Because this decision is being made on a packet level, reservation of throughput resources no longer is made at a one to one ratio. Rather, protection path resources are reserved at a ratio significantly less than one to one. In one embodiment, no resources are reserved for path restoration or protection path routing. Rather, quality of service provisioning is used to resolve interference situations wherein instantaneous demand exceeds capacity. A node evaluates ring conditions in relation to the demand of traffic resources and the relative quality of service ratings to determine whether and how to forward a packet. Additionally, a node decides whether to use the working or protection path by considering the final destination on the fiber optic ring network, any identified ring conditions and, in some embodiments, quality of service. The ring conditions to which the inventive nodes respond include OSI layer 1, layer 2 and layer 3 conditions. In alternate embodiments, the node also evaluates parameters such as identified or assigned quality of service parameters. Whenever a layer 1, a layer 2 or a layer 3 condition occurs, a node generates an overhead signal within fifteen milliseconds of the condition occurring. An ingress node (a node that receives IP traffic and places it onto the fiber optic ring

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network) is adapted to effectuate path restoration within 35 milliseconds of receiving the overhead signal identifying a failure and within fifty milliseconds of the failure condition event.

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